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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/518,695  
Filing Date: September 20, 2005  
Appellant(s): BOXHOORN ET AL.

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Eric B. Compton  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed July 22, 2009 appealing from the Office action mailed November 20, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4,871,580	SCHRAM et al.	10-1989
5,559,065	LAUTH et al.	09-1996

2,297,543	LOCH et al.	09-2000
4,536,482	CARCIA	08-1985
3,969,082	CAIRNS et al.	07-1976

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 51-55, 57, 66, 68, 71, 77, 79, 80, 81, 82 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schram et al. (U.S. Pat. 4,871,580) in view of Lauth et al. (U.S. Pat. 5,559,065).

Regarding claim 51, Schram et al. teach a method for depositing a layer on a substrate. (See Abstract) Introducing a substrate into a processing chamber. (Column 4 lines 56-61) Generating at least one plasma by at least one plasma cascade source. (Column 7 lines 12-15) Depositing at least one deposition material on the substrate under the influence of plasma. (See Abstract; Column 4 lines 64-68; Column 5 lines 1-12) Depositing at least a second deposition material on the substrate by at least a sputtering source. (Column 5 lines 33-38; Column 6 lines 53-65)

Regarding claim 52, Schram et al. teach the plasma passes at least partly through at least one passage of the at least one sputtering electrode to contact the plasma with the electrode. (Column 5 lines 33-38; Column 6 lines 53-65; See Figure 1)

Regarding claim 53, Schram et al. teach the deposition material supplied outside the at least one plasma source into the processing chamber to the plasma in the processing chamber. (Column 4 lines 64-68; Column 5 lines 1-12)

Regarding claim 54, Schram et al. teach at least one volatile compound of the deposition material supplied to the plasma for the deposition. (Column 4 lines 64-68; Column 5 lines 1-12)

Regarding claim 55, Schram et al. teach the volatile compound contains at least one precursor material which decomposes in the processing chamber in material to be deposited before the material has reached the substrate. (Column 4 lines 64-68; Column 5 lines 1-12; Abstract)

Schram et al. teach at least one sputtering electrode which comprises the deposition material arranged in the processing chamber and the plasma is contacted with each sputtering electrode to sputter the substrate with material. (Column 5 lines 33-38; Column 6 lines 53-65)

Regarding claim 83, Schram et al. teach adjusting the substrate to a particular treatment temperature. (Column 4 lines 56-61)

The differences between Schram et al. and the present claims is that utilizing the apparatus for manufacturing a catalyst layer is not discussed (Claim 51), utilizing a deposition material comprising at least one catalyst material which after an activation treatment is catalytically active is not discussed (Claim 57), the substrate being substantially non-porous is not discussed (Claim 66), the substrate comprising at least one metal or alloy is not discussed (Claim 68), the substrate being substantially porous is not discussed (Claim 71), wherein the at least one catalyst material is nickel, copper, palladium, rhodium, platinum or iron or any combination thereof is not discussed (Claim 77), wherein a reducing is carried out at an elevated temperature for the purpose of

reduction of the deposition material deposited on the substrate is not discussed (Claim 79), wherein the reducing step is carried out under the influence of hydrogen is not discussed (Claim 80), wherein an inert gas which contains hydrogen is supplied to the substrate for the purpose of the reduction is not discussed (Claim 81), and wherein the substrate is adjusted to a particular electrical potential by DC, pulsed DC and/or RF biasing is not discussed (Claim 82).

Regarding claim 51, Lauth et al. teach utilizing physical vapor deposition and chemical vapor deposition to form a catalyst layer. (See Abstract) The relevant metal oxide, nitride, carbide is sputtered in the presence of hydrocarbons, oxygen and/or nitrogen in the process gas. (Column 2 lines 48-52) It follows since Schram et al. teach utilizing a gas such as a hydrocarbon and sputtering a metal target that one looking at Lauth et al. would know how to deposit catalyst layers in the apparatus of Schram et al. utilizing the teachings of Lauth et al. (See Schram et al. and Lauth et al. discussed above)

Regarding claim 57, Lauth et al. teach sputtering at least one catalyst material which after an activation treatment is catalytically active. (See Abstract; Column 2 lines 1-10, lines 45-52; Column 4 lines 35-39, lines 62-66)

Regarding claim 66, Lauth et al. teach the substrate to be nonporous. (Column 4 lines 17-18)

Regarding claim 68, Lauth et al. teach the substrate to be a metal. (Column 4 line 16)

Regarding claim 71, Lauth et al. teach the substrate to be porous. (Column 4 lines 17-18)

Regarding claim 77, Lauth et al. teach the catalyst material to be palladium, platinum, copper and rhodium. (See Abstract)

Regarding claim 79, Lauth et al. teach a reducing step carried out at an elevated temperature for the purpose of reduction of the deposition material deposited on the substrate. (Column 4 lines 35-39, lines 62-66)

Regarding claim 80, Lauth et al. teach the reducing is carried out under the influence of hydrogen. (Column 4 line 64)

Regarding claim 81, Lauth et al. teach a mixture of gas containing CO<sub>2</sub> and hydrogen for reducing. CO<sub>2</sub> is inert. (Column 4 lines 62-66)

Regarding claim 82, Lauth et al. teach the sputtering can be bias sputtering. A negative bias is applied to the substrate. This could be DC. (Column 2 lines 33-44)

The motivation for utilizing the features of Lauth et al. is that it allows for preparing coated catalysts in a simple manner. (Column 1 lines 66-68)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Schram et al. by utilizing the features of Lauth et al. because it allows for preparing coated catalyst in a simple manner.

Claims 56, 58, 59, 63, 64, 65, 70, 72, 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schram et al. in view of Lauth et al. as applied to claims 51-55, 57, 66, 68, 71, 77, 79, 80, 81, 82 and 83 above, and further in view of Loch et al. (CA 2,297,543).

The differences not yet discussed is providing at least one second source chosen from the group consisting of a second plasma cascade source, a plasma source, a vapor deposition source and a sputtering source is not discussed (Claim 56), where the deposition material comprises at least one carrier material which material is initially suitable to carry a catalyst material is not discussed (Claim 58), the at least one catalyst material and the at least one carrier material are depositing on the substrate by different sources is not discussed (Claim 59), the substrate comprising sheet material is not discussed (Claim 63), the substrate moving in the processing chamber at least in such a way that each time a different part of the substrate makes contact with the plasma is not discussed (Claim 64), the substrate being brought from an environment into the processing chamber and discharge from the processing chamber to the environment while the deposition material is deposited on the substrate in the processing chamber is not discussed (Claim 65), the substrate being corrugated is not discussed (Claim 70), the carrier material being a metal is not discussed (Claim 72) and the carrier material comprising an oxidizing material is not discussed (Claim 73).

Regarding claim 56, Loch et al. teach utilizing plural gas sources which meets applicant's requirement for a second source. In this instant hydrogen and nitrogen gas sources would be the vapor deposition sources. (Page 5)

Regarding claim 58, Loch et al. teach the deposition material comprises at least one carrier material which material is suitable to carry a catalyst material. (Page 6 last paragraph)

Regarding claim 59, Loch et al. teach the at least one catalyst material and the at least one carrier material are deposited on the substrate by different sources. (Page 5 last paragraph; "sources")

Regarding claim 63, Loch et al. teach the material is sheet material. (Page 2 second paragraph)

Regarding claim 64, Loch et al. teach the substrate is moved in the processing chamber at least such a way that each time a different part of the substrate makes contact with the plasma. (Page 4 last paragraph; Page 5 paragraph 1)

Regarding claim 65, Loch et al. teach the substrate is brought from an environment into the processing chamber and is discharged from the processing chamber to the environment while the deposition material is deposited on the substrate in the processing chamber. (Page 4 last paragraph; Page 5 paragraph 1)

Regarding claim 70, Loch et al. teach the sheet can be corrugated. (Page 2 paragraph 2; Page 9 paragraph 2)

Regarding claim 72, Loch et al. teach the substrate is metal. (Page 9 paragraph 2)

Regarding claim 73, Loch et al. teach the carrier material comprising an oxidizing material. (Page 6 last paragraph)

The motivation for utilizing the features of Loch et al. is that it allows for producing catalyst with large surfaces. (Page 2 top page)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Loch et al. because it allows for producing catalyst with large surfaces.

Claims 74-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schram et al. in view of Lauth et al. and Loch et al. as applied to claims 51-55, 57, 66, 68, 71, 77, 79, 80, 81, 82 and 83 above, and further in view of Garcia (U.S. Pat. 4,536,482).

The differences not yet discussed are where the carrier material comprising a semiconductor material (Claim 74), where the carrier material is an oxidized semiconductor material (Claim 75) and where the carrier material further contains a heat-conducting material (Claim 76).

Regarding claims 74, 75, the carrier material can be a semiconductor material or oxidized semiconductor material. (Column 2 lines 56-59; Column 2 lines 66-68)

Regarding claim 76, the carrier material further contains a heat-conducting material. (Column 2 lines 56-59; Column 2 lines 66-68)

The motivation for utilizing the features of Garcia is that it allows for producing catalyst with good catalytic activity and selectivity. (Column 2 lines 32-35)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Garcia because it allows for producing catalyst with good catalytic activity and selectivity.

Claims 60-62, 67 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schram et al. in view of Lauth et al. as applied to claims 51-55, 57,

66, 68, 71, 77, 79, 80, 81, 82 and 83 above, and further in view of Garcia (U.S. Pat. 4,536,482).

The differences not yet discussed is where the sputtering electrode contains at least a part of both a catalyst material and a carrier material is not discussed (Claim 60), the sputtering electrode containing compressed powders of the catalyst and carrier materials to be deposited on the substrate is not discussed (Claim 61), the sputtering electrode containing an alloy of the catalyst material and the carrier material is not discussed (Claim 62), the substrate comprising at least one carrier material is not discussed (Claim 67), and wherein the deposition material is uniform in mixture is not discussed (Claim 78).

Regarding claim 60, Garcia teach utilizing a sputtering electrode containing at least a part of both a catalyst material and a carrier material. (Column 3 lines 7-21)

Regarding claim 61, Garcia teach the sputtering electrode containing powders of the catalyst and carrier materials to be deposited on the substrate. (Column 6 lines 34-40)

Regarding claim 62, Garcia teach the sputtering electrode containing an alloy of the catalyst material and the carrier material. (Column 3 lines 7-21)

Regarding claim 67, Garcia teach the substrate comprising at least one carrier material. (Column 2 lines 53-59)

Regarding claim 78, Garcia teach the deposition material uniform in mixture. (Column 3 lines 22-25)

The motivation for utilizing the features of Garcia is that it allows for producing catalyst with good catalytic activity and selectivity. (Column 2 lines 32-35)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Garcia because it allows for producing catalyst with good catalytic activity and selectivity.

Claims 69 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schram et al. in view of Lauth et al. as applied to claims 51-55, 57, 66, 68, 71, 77, 79, 80, 81, 82 and 83 above, and further in view of Cairns et al. (U.S. Pat. 3,969,082).

The differences not yet discussed is the substrate is FeCrAlloy is not discussed (Claim 69) and the substrate being a corrugated material is not discussed (Claim 70).

Regarding claim 69, Cairns et al. teach FeCrAlloy as a substrate for carrying catalytic material. (Column 3 lines 1-9)

Regarding claim 70, Cairns et al. teach the substrate being corrugated. (Column 3 lines 7-9)

The motivation for utilizing the features of Cairns et al. is that it allows for providing a substrate that meets a severe environment. (Column 1 lines 39-43)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Cairns et al. is that it allows for providing a substrate that meets a severe environment.

**(10) Response to Argument**

**A. *Response to the arguments of the rejection of claims 51-55, 57, 66, 68, 71, 77, 79, 80, 81, 82 and 83 as obvious under 35 U.S.C. 103 (a) over Schram in view of Lauth:***

In response to the argument that Schram and Lauth do not teach or otherwise render obvious first and second deposition materials, nor simultaneously depositing first and second deposition materials on a substrate, it is argued that Schram teach a first deposition material in the form of a reactant gas and a second deposition material in the form of a solid material sputtered from a sputtering target. The solid material freed from the sputtering target 6 mix with the reactant material to form a deposition material on the substrate where the first and second deposition material are deposited on the substrate. (See Schram discussed above; Schram Column 4 lines 64-68; Column 5 lines 1-12; Column 5 lines 33-38; Abstract; Column 3 lines 44-61)

In response to the argument that Schram and Lauth do not teach contacting the plasma with the at least one sputtering electrode to sputter the substrate with the second deposition material of the at least one electrode, it is argued that Schram teach contacting the plasma with the at least one sputtering electrode to sputter the substrate with the second deposition material of the at least one electrode. (See Schram et al. discussed above; Schram Column 5 lines 33-38)

In response to the argument that Schram et al.'s apparatus is not identical nor similar to Schram et al.'s apparatus, it is argued that Schram et al.'s apparatus is similar to Applicant's apparatus. For Example looking at Fig. 1 a plasma jet contacts the

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sputtering target 6. The plasma is generated by a cascade plasma generator details of which can be seen in Fig. 2. (See Schram Figs. 1 and 2)

In response to the argument that Schram et al.'s plasma jet does not contact the sputtering electrode, it is argued that Schram teach contacting the plasma with the at least one sputtering electrode to sputter the substrate with the second deposition material of the at least one electrode. (See Schram et al. discussed above; Schram Column 5 lines 33-38)

In response to the argument that Lauth do not teach contacting the plasma with the at least one sputtering electrode to sputter the substrate with the deposition material of the at least one electrode, it is argued that Schram teach contacting the plasma with the at least one sputtering electrode to sputter the substrate with the second deposition material of the at least one electrode. (See Schram et al. discussed above; Schram Column 5 lines 33-38)

In response to the argument that Schram not Lauth teach supplying the first deposition material outside the at least one plasma source into the processing chamber to the plasma in the processing chamber and supplying at least one volatile compound of the first deposition material to the plasma for the purpose of the deposition, it is argued that Schram teach supplying a first deposition material outside the at least one plasma source into the processing chamber to the plasma in the processing chamber and supplying at least one volatile compound of the first deposition material to the plasma for the purpose of the deposition. (See Schram et al. Column 4 lines 64-68; Column 5 lines 1-12)

***B. Response to the arguments of the rejection of claims 56, 58, 59, 63, 64, 65, 70, 72 and 73 as obvious under 35 U.S.C. 103(a) over Schram in view of Lauth and further in view of Loch:***

In response to the argument that claims 56, 58, 59, 63, 64, 65, 70, 72 and 73 are allowable for the same reasons that claim 51 is allowable, it is argued that claims 56, 58, 59, 63, 64, 65, 70, 72 and 73 are not allowable for the same reason that claim 51 is not allowable.

In response to the argument that Loch does not teach providing at least one second source chosen from the group consisting of a second plasma cascade source, a plasma source, a vapor deposition source and a sputtering source and depositing a third deposition material on the substrate with the second source, Loch et al. teach utilizing plural gas sources which meets applicant's requirement for a second source. In this instant hydrogen and nitrogen gas sources would be the vapor deposition sources. (See Loch et al. Page 5)

***C. Response to the arguments of the rejection of claims 74-76 as obvious under 35 U.S.C. 103(a) over Schram in view of Lauth and Loch and further in view of Garcia:***

In response to the argument that claims 74-76 are allowable for the same reasons that claim 51 is allowable, it is argued that claims 74-76 are not allowable for the same reason that claim 51 is not allowable.

In response to the argument that Garcia does not teach wherein the carrier material comprises a semiconductor or an oxidized semiconductor, it is argued that

Garcia teach the carrier material can be a semiconductor material or oxidized semiconductor material. (See Garcia et al. Column 2 lines 56-59; Column 2 lines 66-68)

**D. Response to the arguments of claims 60-62, 67, and 78 as obvious under 35 U.S.C. 103(a) over Schram in view of Lauth and further in view of Garcia:**

In response to the argument that claims 60-62, 67 and 78 are allowable for the same reasons that claim 51 is allowable, it is argued that claims 60-62, 67 and 78 are not allowable for the same reason that claim 51 is not allowable.

**E. Response to the arguments of claims 69 and 70 as obvious under 35 U.S.C. 103(a) over Schram in view of Lauth and further in view of Cairns:**

In response to the argument that claims 69 and 70 are allowable for the same reasons that claim 51 is allowable, it is argued that claims 69 and 70 are not allowable for the same reason that claim 51 is not allowable.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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